

Lean Adoption in Third Party Logistics Industry to Achieve Efficient Logistics Activities

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Received: October 12, 2019 Revised: November 12, 2019 Accepted: December 05, 2019

Abstract

Purpose: This study focuses on lean implementation evaluation in Third Party Logistics (TPL) industry by using the lean principles measurement from Toyota Ways which consist of 14 principles. The core goal of this study is to appraise the lean implementation level in Third Party Logistics in East Java of Indonesia in order to achieve efficient logistics, distribution and transportation activities.

Research design, data and methodology: This study uses a sample of 80 respondent who are Third Party Logistics managers in East Java Province, Indonesia. Data collection uses a questionnaire and standard statistical test was performed in order to analyze questionnaire. **Results:** The implementation level of lean management in Third Party Logistics shows that application of principle 3 (utilizing pull systems) has a higher score than the other principles. This situation shows that management give the best performance in plan process. They prioritize customer requirement in every process designed. However, the principle 8 (using reliable technology) show the weakness performance. **Conclusions:** Overall, this study shows the Third Party Logistics in East Java Province of Indonesia have applied the lean principle quite well, although the scores are only slightly above the average. This condition provides a strong basis for further lean implementation, especially for improving logistics, distribution and transportation activities in Third Party Logistics Business.

Keywords: Third Party Logistics, Lean, Adoption, Performance, Distribution

JEL Classification Code: D20, D30, L20, L80, L90

1. Introduction^a

The current situation, many companies outsource logistics activities to third party logistics. Third party logistics is a service company that performs part or all the logistics activities of consumers that uses its services. The service industry holds an important role in a knowledge-based economy. Third party logistics industry is an example of an emerging service-based industry. Third party logistics industry is an industry that has grown from a transportation industry concept to a broader industry concept that serves the logistics needs of customers. Service performance from Third Party Logistics holds an important role in the advancement of the business logistics industry. It is very

important to study about lean service performance from Third Party Logistics industry because the performance of Third Party Logistics will effect on the performance of the customer. Third Party Logistics needs to pay attention on service process in order to provide better services for customers.

Outsourcing logistics services to the appropriate Third Party Logistics will provide benefits. Some benefits gaining from outsourcing are service improvement; cost reduction for investing equipment, facilities, human resources and information technology; and focusing on core competencies (Berglund, Laarhoven, Sharman, & Wandel, 1999; Boyson, Corsi, Dresner, & Rabinovich, 1999; Cheng & Tang, 2014; Lieb, 2008; Maloni & Carter, 2006; Wang, Zantow, Lai, & Wang, 2006). These benefits support the company to carry out its main business processes more efficiently and rapidly.

However, if company choose not appropriate Third Party Logistics then outsourcing activity logistics will create the problems for the company. Therefore, outsourcing logistics function will provide benefits if Third Party Logistics provide excellent work performance that supports consumer

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performance. Third Party Logistics support the performance of consumers if the Third Party Logistics has worked efficiently or there are no waste activities. In other words, TPL's work performance must fulfill the lean principle criteria. Implementation of lean principle in Third Party Logistics is indispensable to support consumer performance. For this reason, efforts to develop lean analysis are needed in Third Party Logistics so that Third Party Logistics has efficient performance through the implementation of lean principles.

The level of lean of Third Party Logistics industry has not been studied extensively in the logistics research literature in Indonesia. Few studies have addressed lean logistics of Third Party Logistics services in Indonesia, especially in East Java. A comprehensive study is required to analyze the efficiency or lean performance of the Third Party Logistics industry. Several lean performance measurements were presented in several leading logistics journals, but very little empirical testing was carried out in developing countries, such as in Indonesia.

Currently, studies that examine the level of implementation of lean principle in Third Party Logistics in Indonesia, specifically in East Java have not been done much. Therefore, it is necessary to conduct a study that measures the implementation of lean principle in Third Party Logistics in East Java so that it is known which principles must be improved by the Third Party Logistics industry in the region. Consequently, this paper is aimed to analyze the implementation level of lean principle in Third Party Logistics in East Java, Indonesia. In the next section, a review of literature that identifies lean principle will be presented. This section is followed by the research design and methodology, results and discussions and conclusions.

2. Literature Reviews

2.1. The Basic Concept of Lean Management

Lean thinking came from the Toyota Production System in the 1950s (Shingo, 1988). Lean is a term coined by Womack, Jones, and Roos (1990) which analyze the development of car manufacturing from craft production to lean production. The lean concept can be realized in various ways, through total quality management (TQM); just in time (JIT); and computer integration in the fields of design, management, distribution and supply chain (Forrester, Hassard, & Lilley, 1996; Shamah, 2013).

The main focus of lean considerations is on the elimination of waste. Lean means what is not needed. Lean tools are used to reduce unnecessary activities throughout the supply chain (Sezen & Erdogan, 2009). Lean processes add value to the supply chain through releasing the "waste",

such as reducing waiting time, reducing excess movement and transportation (Jones & Hines, 1997). Leanness in the supply chain is beneficial to gain profit through decreasing costs (Singh & Pandey, 2015).

Lean implementation considers to reducing all types of waste during business processes. In the implementation of "lean thinking", activities or solutions are carried out to eliminate waste, enhance value added operations (VA) and reduce non value added operations (NVA). The VA and NVA concepts are mostly from TPS (Wee & Wu, 2009). Reducing waste is encouraged by the need to be a winner in the competitive business environment. At this time, leanness has become a popular research concept (Singh & Pandey, 2015).

Waste is "business activity that uses resources without creating value". The seven activities that can be categorized as waste are 1) Over production; 2) Waiting time; 3) Unnecessary movement or transportation of materials; 4) Rework and Reprocessing; 5) Excess inventory not required for processing; 6) Unnecessary movements of employees; 7) Defects (Shamah, 2013; Womack & Jones, 2003).

Lean thinking is a driving factor for developing the core competencies of the supply chain through the allocation of all resources that will create value for stakeholders. Lean implementation is a way to create value in the supply chain. Value creation is the company's goal. Value should be created not only for shareholders but also for all stakeholders. Value can be defined as "the capacity of good, service, or activity to satisfy a need or provide a benefit for a person or legal entity" (Haksever, Chaganti, & Cook, 2004). Value creation depend on three parties, namely customers, employees and investors (O'Malley, 1998; Shamah, 2013).

Lean thinking can be used as a framework to improve the company. One of the main objectives of strategy formulation and implementation is to create excellent continuous improvement (Forrester, Shimizu, Soriano-Meier, Garza-Reyes, & Basso, 2010). Several companies perform business better than others in the same market and in competitive competition (De Oliveira & Fensterseifer, 2003). The different performance can be related with internal factors such as knowledge and other strategic assets that affect company performance. In the resource-based view, company consists of different resources that have different capabilities and strategies that lead company to have different potential capabilities. The resource-based view emphasizes firm's internal resources as a major determinant for improving performance (Forrester et al., 2010; Shamah, 2013).

In the era of 1990s, the concept of lean has expanded from the operational level to the strategic level (Hines, Holweg, & Rich, 2004). Lean has been applied in various industrial sectors. Lean focus has switched from reducing

waste and costs to increasing the perceived value of customers by adding product or service features and eliminating wasteful activities (Hines et al., 2004). In other words, lean means adding value to stakeholders (Shamah, 2013).

There are five principles that companies must follow to achieve overall value creation: 1) Determine the value of their products as perceived by their customers; 2) Understand the value stream in the company; 3) Remove obstacles to the flow of values; 4) All production activities are triggered by real demand from the market; 5) Continuous improvement from previous steps to ensure that methods and systems are continually cleaned of waste (Mascitelli, 2000; Shamah, 2013; Womack & Jones, 1996b, 1996a).

There are four important things in implementing lean principle. They include leadership and management; financial capabilities; skill and expertise; organizational culture. These four things are critical factors determining the success of a lean project. Among the four factors, leadership and management commitment is the most important in determining the implementation of lean principles. A strong ethos of leadership and management commitment is fundamental to the successful implementation of lean in an organization (Achanga, Shehab, Roy, & Nelder, 2006).

In lean concept implementing, companies must have strong leadership and have good managerial skills. All of which will integrate infrastructure in an organization. Good leadership will be able to implement the company's vision and strategy for the benefit of the organization. Good leadership can grow skills and increase knowledge of workforce in an effective way. Thus, the company can implement lean successfully (Achanga et al., 2006).

Financial ability is an important factor that determines a project. Finance supports efforts to create corporate programs such as consulting and training. The application of lean principles requires financial resources to hire consultants as well as to help implement the emerging ideas. Training also requires financial resources. Financial insufficiency is a major obstacle to the adoption and implementation of lean principles (Achanga et al., 2006).

The future of company development lies in the use of intellectual capital and the ability to innovate. If the company employs people with low skills and expertise, it will not foster new ideas that support the company's achievements. This condition will frustrate the company's improvement strategy, because lean application process requires the skills and expertise of employees (Achanga et al., 2006).

The creation of a supportive organizational culture is an important platform for the implementation of lean principles. High-performance companies are companies

that have a culture of continuous and proactive improvement. Culture of a strategic team that be able to operate in diverse environments, have communication skills, and focus on the long term goal will support the implementation of new ideas (Achanga et al., 2006).

Several studies have been carried out to broaden the lean approach to achieve sustainability meaning. The lean principle seeks to improve the sustainability of industry. The lean principle is aimed to reduce waste and produce capital gains. Sustainable benefits can be achieved by applying lean principles. Some of the sustainable benefits of the lean principle are reductions in material use, energy consumption, hazardous waste, water, etc. (Vinodh, Arvind, & Somanaathan, 2011).

In term of future research, supply chain research opportunities can be classified into four main themes, namely "the need for theoretically grounded research; the need for a multi-functional approach; the need for a system approach that adds strategic insight; and the need for integrated measurement application" (Mollenkopf, Stolze, Tate, & Ueltschy, 2010; Vinodh et al., 2011).

2.2. The Fourteen Lean Management Principles and 4P Model as Tools for Continuous Improvement

Continuous improvement is an intensive process to achieve the desired organizational performance (Davidson, Crowder, Gordon, Domitrovich, Brown, & Hayes, 2018). Continuous improvement can be seen as an evolutionary process that should be managed continuously (Fai, Thai, & Diew, 2016). To perform process improvement effectively and efficiently, lean management is a key element (Martínez-Jurado & Moyano-Fuentes, 2014). The continuous improvement is the main goal of lean management. Lean implementation principles contribute to increased productivity, customer satisfaction and profit (Ruiz-benítez, López, & Real, 2018).

In a highly competing market, delivering high quality services and products is a critical need to survive. Lean philosophy can be a resolution to achieve that objective (Sumantri, 2017). This method was used by Toyota Production System. The objective of implementation of lean principle is minimizing resources, fewer defects, and growing variety of products. In lean principle, production system should utilize human effort, space, tools, time and inventory efficiently (Shah & Ward, 2007).

Business system needs a specific indicator to assess the leanness level in their organizations (Bayou & Korvin, 2008). There are 14 principles of the Lean Management from Toyota Ways consisted of 1) managing decisions based on a long-term philosophy; 2) creating a continuous process to solve the problem; 3) utilizing pull systems to

avoid overproduction; 4) minimizing workload; 5) building a culture to get quality; 6) standardizing tasks and processes; 7) using virtual control; 8) using reliable technology; 9) growing leader; 10) developing people and team; 11) respecting to partner; 12) understanding the situation; 13) considering all option in decision making; 14) becoming learning organization. Lean management principles are fundamental basics for continuous improvement. Liker has categorized 14 lean principles into four main frames. The frames consisted of problem solving; people and partners; process; and long-term philosophy (Liker, 2004; Meiling, Backlund, & Johnsson, 2012).

Visualization of lean principles is often embodied in the 4P model by Liker (Liker, 2004; Meiling et al., 2012). They are evaluating the effectiveness of the Liker's 4P factors to advance the leanness level in their case study. Management of 14 principles from the 4P model is needed for sustainable improvement. The measurement is important to find out how far the principle is adopted by the company.

The increasing competition in the industrial environment encourage organization to evaluate lean implementation in their organization (Agustin & Sumantri, 2017b). This condition also affects to the Third Party Logistics (TPL) sector (Agustin & Sumantri, 2017a). The core goal of this study is to measure the lean implementation level in Third Party Logistics in East Java of Indonesia refer to Liker's 4P model (Liker, 2004; Meiling et al., 2012).

3. Research Design, Data and Methodology

3.1. Data Collection Design

This research is investigating lean implementation level in Third Party Logistics Industry in East Java of Indonesia by using Liker's classification (4P Model) (Liker, 2004; Meiling et al., 2012). Literature studies were used to collect information about the lean performance measurement and 4P Model. A questionnaire was used to collect data and then it was analyzed to investigate the implementation of 4P Model. The questionnaire measures the implementation level of lean principles. The number of questions in the questionnaire is limited so it can be answered no more than 15 minutes. The questionnaire used in this study is intended by Meiling et al. (2012). The question uses the five-point Likert scale to measure the extent of respondent agreement for each statement. Each statement ranges from score 1 to 5; 1 means low implementation level; 2 means not enough implementation level; 3 means some effort done to implement the lean. The score 4 shows intensely implementing of lean principles in the organization. The score 5 indicates the outstanding implementation of lean principles in the organization. To guarantee a valid and understandable questionnaire, the questionnaire was tested

in the small group before being used to collect data. The Cronbach Alpha test was used to assess the questionnaire. The results from Cronbach Alpha test shows $\alpha = 0.72$. It proves the reliability of the questionnaire so that questionnaire can be used to collect data. Adjustment based on pre-test is used as an improved questionnaire.

3.2. Data and Analytic Methods

The study sample was collected based on a random sampling method. The sample of population was selected from the Industrial and Trade Service Data Base of East Java of Indonesia. In that database, there are the initial 400 companies from a list of East Java Third Party Logistics. Following that sample process, 400 Third Party Logistics were confirmed by verifying their contacts and were selected as preliminary research subjects. We reduced the number of Third Party Logistics from 400 TPL to 100 TPL that is available and appropriate for the survey. The survey was administered for six months from January 2019 to June 2019. The questionnaire was distributed and awaited the return process with a response rate of 90% of the number of respondents contacted and 10% of the questionnaire are not returned. The number of collected surveys totaled 90. Furthermore, we reviewed the contents of the survey answers and reduced the number of samples to 80 because 10 questionnaires are invalid response. Therefore, the analysis was conducted for 80 questionnaires. In this study, we used a standard analysis to investigate the result of research. After collecting and analyzing the data, descriptive statistics is used to explain the result of this study.

4. Results

4.1. Demographic Information

This study was conducted in the Third Party Logistics in East Java Province, Indonesia. The demographic information of survey participants can be seen in Table 1.

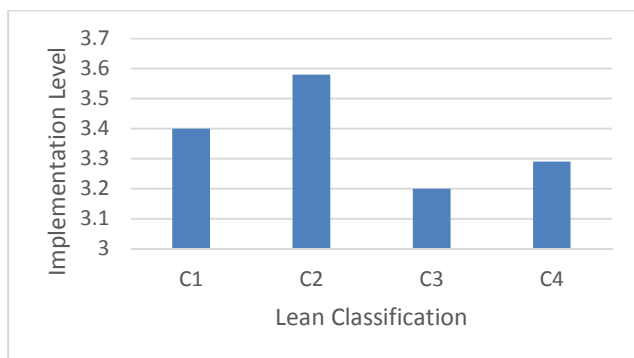
In terms of providing services, all of the respondents worked in transportation logistics service providers such as shipping companies and freight forwarders. In terms of job position, all of respondent are managers. The gender ratio of the respondents was 97,5% for males and 2,5% for females. In relation to age, 40% were in their 30s, 45% were in their 40s, and 15% were in their 50s and older. Regarding work experience, those having less than 5 years as many 37%; between 5-10 years as many 50%, and more than 10 years' experience as many 13%.

Table 1: Demographic Information of Survey Participants

Category		Frequency	Ratio
Gender	Female	2	2,5%
	Male	78	97,5%
	Total	80	100%
Age Range	30-39 years	32	40%
	40-49 years	36	45%
	50 years	12	15%
	Total	80	100%
Experience	Less than 5 years	30	37,5%
	5-10 years	40	50%
	More than 10 years	10	12,5%
	Total	80	100%

4.2. Questionnaire Analysis

Overall, only less of companies succeed implement lean principles. The lean principle implementation in Third Party Logistics in East Java is quite rigorous. The TPLs have applied lean principles well around 35%. Around 45% of them are quite implementing. The number of Third Party Logistics that was lacking in lean application is around 20%. In detail, the lean principles can be classified into four groups; problem solving; process; people and partners; long-term philosophy (Liker, 2004; Meiling et al., 2012). The response of Third Party Logistics was used to calculate the average level of lean implementation. The results can be seen in Figure 1.

**Figure 1:** Implementation Level of Lean Classification in TPLs

In the C1 category, which is about Philosophy, the results of the study show a score of 3.4 in a scale of 5. This means that the personnel of the organizations have better understanding to the long-term philosophy of the organization. The management applies the philosophy of organization. The process carried out looks at long-term goals so the system will continue to develop in a better

performance. Organizational philosophy is the basis for other activities both current and future condition.

In the C2 category, which is about the process, Third Party Logistics have a higher value than the other variables. It is around 3.58 in the five of range scale. The process involves flow, pull system effort, leveling workload, work tasks standardization, visualization control, reliable technologies and stopping the process as soon as a problem happens. The results of this study indicate that TPLs prioritizes processes in the organization. It should be noted that by using the lean methods will not modify the organization to be a lean organization immediately. Tools, methods and technologies will develop the result of lean implementation by process.

In the C3 category, namely managing human resources and partners, the rank is lowest with a score of 3.2. The Third Party Logistics have not fully cooperated with partners. They prefer to manage their own processes. By focusing attention to human resource and partner development in organizations perform a crucial role in organizational success. Lean goals will be achieved if it is supported by reliable resources. In lean philosophy, the human resources and partner development will be able to bring useful lean systems.

Table 2: Mean and Standard Deviation of Lean Implementation Level in TPLs

Principle	Mean	Standard Deviation
1	3,4	0,745
2	3,567	0,472
3	3,93	0,101
4	3,4	0,4
5	3,5	0,785
6	3,78	0,826
7	3,63	0,534
8	3,1	0,495
9	3,167	0,693
10	3,267	0,825
11	3,35	0,69
12	3,253	0,603
13	3,425	0,414
14	3,22	0,683

The forth factor is problem solving (C4). Problem solving method would be established on the organization's philosophy. A problem emerged in an organization should not be a threat. That problem can create value for an organization if the organization can take knowledge about the solving pattern. However, the problems should not be

just solved. Their roots should be identified. Organizations should prevent such problems for the forthcoming period. Organization should be a good learner from the problem solving. Finding roots of the problems and solving them, will develop the organization become a learning organization. This condition will generate an opportunity for forthcoming development (Womack & Jones, 2004).

In detail, the implementation level of each principle will be explained in the following part. The Table 2 and Figure 2 are tabulation of the results of data analysis about the level of implementation of the lean principle referring to the Liker Model (Liker, 2004; Meiling et al., 2012).

It can be detected in Figure 2 that the implementation of lean management level in Third Party Logistics shows that application of principle 3 (utilizing pull systems) has a higher score than the other principles. This situation shows that management give the best performance in plan process. They prioritize customer requirement in every process designed.

However, several principles have low score, such as Principle 8 (using reliable technology), 9 (growing leader), 10 (developing people and team), 12 (understanding the situation), and 14 (becoming learning organization). The score of these principles below 3,3. The principle 8 (using reliable technology) shows the weakness performance. From these data, can be concluded that Third Party Logistics in East Java are low in relation to organizational management. They must improve in terms of leadership, developing teamwork and learning organization.

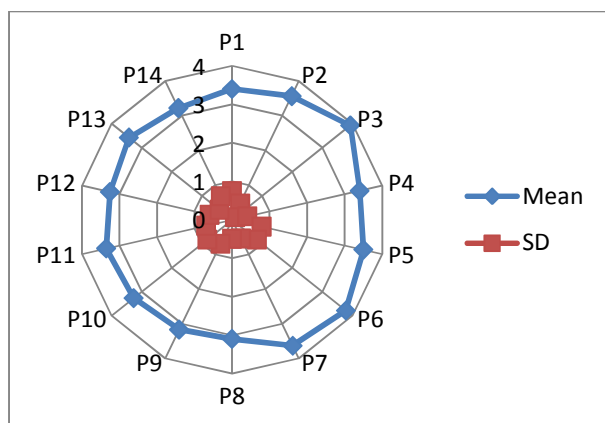


Figure 2: Implementation Level of 14 Principles of Lean in TPLs

In an era of competitive environments, relationship between followers and leaders is critical in enhancing organizational effectiveness and efficiency. It occurs also in the relationships between managers and their subordinates in departments to achieve organization's objectives (Ishak, Ismail, Abdullah, Samsudin, & Mohamed, 2018).

A high quality of relationship between managers and subordinates have a significant impact on workplace justice which enhance the personal outcomes, such as job satisfaction and organizational commitment. Quality relationship between followers and leaders will act as a significant determinant of personal outcomes (Ishak et al., 2018).

Management should improve their leadership behavior in the organizations. Management must focus on the leadership aspects. Leadership training program should upgrade managers' skills and knowledge in organizing diverse employee expectations and backgrounds. Manager abilities influence employees in achieving their targets. Furthermore, third party logistics company should provide reward as performance level. When employees feel that they receive the reward equal with their contributions, they will be motivated and increase their productivity. In order to enhance collaboration and cooperation between management and employees, participative work culture should be implemented in performing key performance indicators (Ishak et al., 2018).

Overall, this study shows the Third Party Logistics has applied the lean principle quite well, although the scores are only slightly above the average. This condition provides a strong basis for further lean implementation in Third Party Logistics in East Java, Indonesia. Furthermore, Third Party Logistics Industry in that region is expected to support the interests of consumer companies.

Outsourcing logistics activities to third party logistics become the solution for companies to focus on the core business (Cho & Lee, 2011). The current enterprises must focus on their core business, reducing expenses, enhancing service quality and continuing improvement. As consequence, non-core area of their business can be outsourced to external parties to achieve the objective. The outcomes of outsourcing in the logistics field show high performance results in commercial endeavors (Yoo, 2014).

Eventually, Third Party Logistics in East Java is expected to contribute not only for customers in that region but also for national and international market. Currently, Indonesia and other countries in the world are trying to improve economic welfare. This effort is carried out through multi-national, regional and bilateral cooperation. In carrying out this collaboration, several logistical barriers that must be overcome arise, such as high tariffs from local carriers; high inventory tax; high price from local suppliers; high tariffs from local carriers; high inventory taxation; excessive customs procedures; complicated customs procedures; and hard to access required information (Yoo, 2016). In general, everything that has an impact on increasing price must be corrected.

High logistics cost impact on international and domestic market. High logistics cost in international market impact

on lowering price competitiveness and then reducing international trade. In domestic market, higher logistics cost impact on increasing price in the domestic market and impact on local economy. Therefore, it is urgent to decreasing logistics cost to increasing national competitiveness (Cho & Lee, 2011).

In order to achieve the success of Third Party Logistics, several efforts are needed, such as government must support the development of Third Party Logistics business; Third Party Logistics must increase their contribution, deliver added value, provide flexible and customized services for their customers; develop their human resource; develop alliance strategy; and increase cooperation level with their customer (Yoo & Kim, 2011).

In the domestic market, four actions are recommended for Third Party Logistics to solve the problems. First, supporting system through the laws and regulations for the growing of small and medium enterprises. Second, development of educational program to support human resource development. Third, increasing relationship between Third Party Logistics and their customer through intensive communication. Fourth, adoption of high technology distribution system. The analysis of potential challenge would assist the third party logistics industries perform domestic logistics function and support Third Party Logistics to enter into the global market (Cho & Lee, 2011).

5. Conclusions

The appraisal of leanness level is essential for organizations. Lean study is needed in Third Party Logistics. By implementing 4P model will deliver a chance for the upgrading of Third Party Logistics performance and have supported consumer performance. However, implementation of lean principles would not be simple. The TPLs in East Java have applied lean principles quite well. Furthermore, Third Party Logistics Industry in that region is expected to support the interests of consumer companies. In detail, the philosophy criteria got a score of 3.4; process criteria reach a score of 3.58; people and partners got a score of 3.2 and problem-solving criteria reach a score of 3.29. It can be summarized that the TPLs in East Java are more employing category 2 of lean principles related to the other categories, namely the process. It means that the owner or manager prioritizes the process as tools to accomplish quality performance. This condition provides a strong basis for further lean implementation, especially for improving logistics, distribution and transportation activities in Third Party Logistics Business. The appraisal of leanness level is essential for organizations. By implementing 4P model will deliver a chance for the upgrading of organization.

In term of C1 category, the employees and management of the TPLs in East Java have better understanding to the long-term philosophy of the organization. The system has developed better performance continuously. In term of C2 category, TPLs in East Java prioritizes processes in the organization. The process involves flow, pull system effort, leveling workload, work tasks standardization, visualization control, reliable technologies and stopping the process as soon as a problem happens. In relation to C3 category, lean goals will be achieved if it is supported by reliable resources. The human resources and partner development will be able to bring useful lean systems. In relation to C4 category, problem solving method would be established on the organization's philosophy. That problem can create value for an organization if the organization can take knowledge about the solving pattern.

The implementation of lean management level in Third Party Logistics of East Java shows that application of principle 3 has a higher score than the other principles. This situation shows that management give the best performance in plan process. They prioritize customer requirement in every process designed. However, several principles have low score, such as Principle 8, 9, 10, 12 and 14. The score of these principles below 3,3. The principle 8 (using reliable technology) shows the weakness performance. In order to achieve the success of Third Party Logistics, several efforts are needed, such as using reliable technology; growing leadership; developing people and team; understanding business situation; and becoming learning organization. Third Party Logistics must increase their contribution to customers through delivering added value, providing flexible and customized services; developing alliance strategy; and increasing cooperation level with their customer. With the purpose to achieve generalized results, a widespread study covering several Third Party Logistics are needed.

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